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FREQUENCY OF HOOKWORM DISEASE OR GROUND ITCH ANEMIA AMONG PUBLIC SCHOOL CHILDREN IN SOUTHERN FLORIDA.

By CH. WARDELL STILES, Ph. D., Chief, Division of Zoology, Hygienic Laboratory, Public Health and Marine-Hospital Service.

In February, 1910, the opportunity of examining a number of school children in Southern Florida for hookworm disease presented itself. In company with Dr. Ed. E. Lindeman, of the state board of health laboratory, at Tampa, and Dr. John S. Helms, one of Florida's pioneer students of hookworm disease, I visited 8 schools located in 3 counties and saw 1,306 school children. The pupils were classified as "suspects," "doubtfuls," and "not suspects," on the basis of external appearance, supplemented occasionally by more careful physical examination, but in no case by microscopic examination. Experience has shown that in a classification of this kind there are a number of hookworm cases which escape attention and that in connection with the number selected as "suspects" there is a theoretical error, due chiefly to the difficulty of determining (without microscopic examination) whether the person has lost all the parasites, but still shows the effects of former infection.

The results of the examination are shown in the following tables:

PLANT CITY, HILLSBORO COUNTY.

	Number seen.	Number of suspects.	Per cent of suspects.
Graded School:			
Boys.....	129	97	75.1
Girls.....	144	80	55.5
Total.....	273	177	64.8
High School:			
Boys.....	26	16	61.5
Girls.....	41	8	19.5
Total.....	67	24	35.8

LAKE LAND, POLK COUNTY.

Boys.....	211	103	48.8
Girls.....	278	70	25.1
Total.....	489	173	35.3

MANATEE, MANATEE COUNTY.

	Number seen.	Number of suspects.	Per cent of suspects.
Boys.....	36	28	77.7
Girls.....	38	23	60.5
Total.....	74	51	68.9

ELLENTON, MANATEE COUNTY.

	Number seen.	Number of suspects.	Per cent of suspects.
Boys.....	14	13	92.8
Girls.....	20	18	90.0
Total.....	34	31	91.1

PALMETTO, MANATEE COUNTY.

	Number seen.	Number of suspects.	Per cent of suspects.
Boys.....	40	38	95.0
Girls.....	50	38	76.0
Total.....	90	76	84.4

BRAIDENTOWN, MANATEE COUNTY.

High and grammar school:			
Boys.....	64	55	85.9
Girls.....	75	55	73.3
Total.....	139	110	79.1
Primary (first to fourth grades) school:			
Boys.....	76	59	77.6
Girls.....	64	30	46.8
Total.....	140	89	63.5

SUMMARY OF 1,306 PUPILS IN 8 SCHOOLS IN 6 TOWNS IN 3 COUNTIES.

	Number seen.	Number of suspects.	Per cent of suspects.
Boys.....	596	409	68.6
Girls.....	710	322	45.3
Total.....	1,306	731	55.9

In the large majority of pupils classified as "suspects," the infection was so evident that a microscopic examination would be unnecessary from a practical point of view, although interesting from an academic viewpoint. Admitting that some errors may have been made, the point may be mentioned that a number of the "doubtfuls" would unquestionably have shown infection had they been examined microscopically. The number classified as "suspects" may, as experience shows, be taken as an ultraconservative estimate of the number of these children who had hookworm infection. In fact, according to experience, on basis of 55.9 per cent "suspects," it may be concluded that the infection is probably not less than 80 per cent—which was the estimate made by Doctor Helms before we began to examine the children.

The percentages for Braidentown and Palmetto were reduced by the presence of a number of northern children who had recently gone to these towns, either for the winter or for a longer period. The difference in condition between these northern children and the Florida children was striking.

Attention may be invited to the fact that the pupils in these schools represented not only some very poor children from the farms, but also children of very well-to-do families from farms and towns.

These statistics of school children are exceedingly significant, from various points of view:

First. These children are growing up under a severe physical handicap. If they do not undergo medical treatment, not only will this handicap be appreciable in deaths due directly to hookworm infection, but this infection will so reduce their vitality that they will more readily fall a prey to other diseases, such as tuberculosis, pneumonia, malaria, etc.

Second. Their physical development is of necessity inhibited, and many of them may reach maturity stunted in their growth.

Third. Children in this condition can not possibly be expected fully to assimilate the education which is being given to them, and as a result the money being spent on education is not giving to these towns full returns. As we picked out the hookworm suspects, the teachers told us that other children of similar appearance were absent. This fact is in harmony with my general experience that hookworm pupils show a high degree of absenteeism from school. The teachers called attention to the fact that several of the pupils, in whom we recognized severe infection, had failed to pass their examinations (so-called "repeaters"); this also is in harmony with my experience elsewhere.

Fourth. Not only these 3 counties but all other parts of the South visited by winter tourists should awaken promptly to the self-evident fact that the danger is present that such tourists will soon avoid those rural portions of the South in which the soil pollution is so extensive as to lead to 55.9 per cent hookworm infection among the school children.

Hookworm disease in teachers.—At least 5 of the teachers in the schools visited showed clear and pronounced effects of hookworm infection. It is physiologically impossible for these teachers to give their best efforts to the children in the matter of instruction. The teachers in the various schools showed us every possible courtesy and exhibited the greatest amount of interest in the examinations we were conducting.

We had but little opportunity of discussing the hookworm problem with others than teachers and physicians, but the number of privies which we noticed were provided with the "pail system" testified to the activity of the Florida state board of health.

The vernacular term "hookworm disease."—The scientific worker has occasion to notice that many people who are not ashamed to admit that they have had "ground itch" and that they are "anemic" are extremely indignant at the suggestion that they have "hookworm disease." If they are told that they have "uncinariasis," they may be enthusiastic to undergo treatment; but if told that they have "hookworm disease," they may indignantly refuse to consider treatment.

Absurd as the situation is, a serious practical problem is facing us in some localities, because of the odium which has become attached to "worms" in the popular mind, and as human life is involved, it seems wise to find for uncinariasis some more acceptable vernacular name which can be used in announcing the nature of the infection to the less philosophical of the patients.

As anemia is one of the most common symptoms, and as ground itch is the most common method of infection and a condition which is well known, I would suggest the use of the term "ground itch anemia" as a vernacular term for uncinariasis to be used with persons who are too proud or too sensitive to be treated for "hookworms."

The term "ground itch anemia" seems of more general applicability than do the terms "brickmaker's anemia," "tunnel anemia," "cotton mill anemia," "sand hill malaria," etc., which are occasionally used for this infection.

HOOKWORM DISEASE IN THREE COTTON MILLS IN NORTH CAROLINA.

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During a recent visit to Rockingham, N. C., upon invitation of the mayor, the officers of the 10 cotton mills, and a number of the residents, to deliver a popular lecture on hookworm disease, the occasion was utilized to visit 3 of the cotton mills, in order to estimate the percentage of hookworm infection. Going through the mills I divided the people into "suspects," "doubtfuls," and "not suspects," and classified them by sex and by age (estimated) as under 16 years, from 16 to 20 years, and over 20 years old. The results are shown in the following tables:

	Under 16.		16 to 20.		Over 20.		Total.	
	Suspects.	Number.	Suspects.	Number.	Suspects.	Number.	Suspects.	Number.
<i>Mill A.</i>								
Males.....	13	17	4	4	20	33	37	54
Females.....	6	11	5	11	6	21	17	43
Total.....	19	28	9	15	26	54	54	97
<i>Mill B.</i>								
Males.....	12	12	8	8	14	16	34	36
Females.....	10	15	6	12	9	17	25	44
Total.....	22	27	14	20	23	33	59	80
<i>Mill C.</i>								
Males.....	5	6	5	6	12	19	22	31
Females.....	5	7	7	9	10	19	22	35
Total.....	10	13	12	15	22	38	44	66
<i>Summary of 3 mills.</i>								
Males.....	30	35	17	17	46	68	93	120
Females.....	21	33	18	32	25	57	64	122
Total.....	51	68	35	49	71	125	157	242

PERCENTAGES OF SUSPECTS.

	Under 16.	16 to 20.	Over 20.	Total.
Males.....	87.5	100.0	67.6	77.5
Females.....	63.6	56.2	43.8	52.4
Total.....	75.0	71.4	56.8	64.8